Trend Study 3-2-01

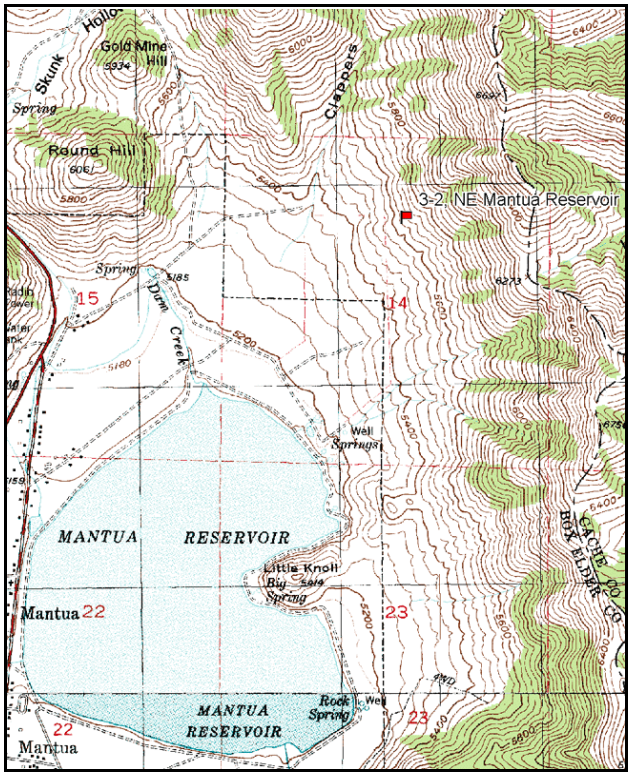
Study site name: NE Mantua Reservoir . Vegetation type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 168 degrees magnetic.

Frequency belt placement: Line 1 (11 & 95ft), line 2 (59ft), line 3 (71ft), line 4 (34ft).

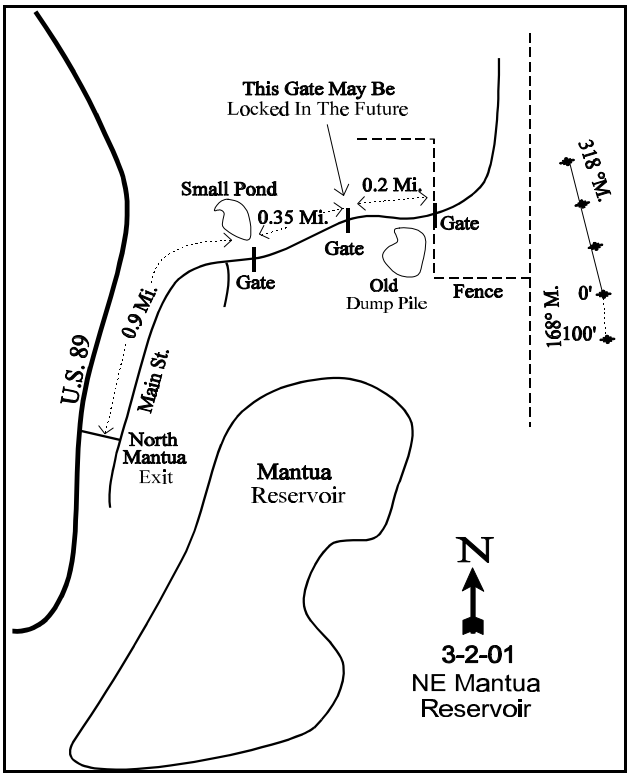
LOCATION DESCRIPTION

Turn east off of U.S. 89-91 at the north Mantua exit and travel east to main street in Mantua. Turn left (north) on main street and proceed 0.9 miles to a gate with a small pond to the left. Proceed through the gate, stopping at another gate after 0.35 miles (this gate may be locked in the future). Proceed 0.2 mile to another gate with an old dump to the south. From the gate walk south-east to a "T" in the fence. From the "T" in the fence, walk 60 paces at a bearing of 112 degrees magnetic to the 0-foot baseline stake. Baseline 0-foot stake is marked by browse tag #7105. The first 100 feet of the baseline runs south at a bearing of 165 degrees magnetic. The last 300 feet run north off of the 0-foot stake at a bearing of 318 degrees magnetic.



Map Name: Mount Pisgah

Township 9N , Range 1W , Section 14



Diagrammatic Sketch

UTM 4596798 N 423322 E

DISCUSSION

Trend Study No. 3-2

The Northeast Mantua Reservoir study samples a mountain big sagebrush community about 1 mile from Mantua Reservoir. The site lies on a moderately steep (25%), west facing slope. Elevation is approximately 5,600 feet. Big game use of this site was light in both 1996 and 2001. A pellet group transect read along the baseline in 2001 estimated 21 deer days use/acre (51 ddu/ha), while no elk pellets were sampled in the transect. Quadrat frequency of deer and elk pellet groups was low in 1996 and 2001. Domestic livestock use the surrounding area in summer, but appear to have had little impact on the immediate area. No cattle pats were sampled in 2001 in either the pellet group transect or within the quadrats.

The NRCS mapping unit describing the site is entitled "Goring-Yates Hollow Association, Moderately Steep." Soils in this unit are alluvially deposited from sandstone and quartzite parent material. These are deep, well drained soils. Soils are clay in texture in the upper horizons and a clay loam grading to a more gravelly clay below. Complete drying of the soil seldom occurs below a depth of 12 inches. Although erosion hazard is moderate (Chadwick et al. 1975), an erosion condition classification determined soils to be stable in 2001 due to adequate vegetation and litter cover. Soils are slightly alkaline (pH of 7.4) and contain moderately high organic matter (3.6%). Effective rooting depth (see methods) was estimated at 15 inches in 1996.

Browse composition at the site is dominated by a moderately dense and stable population of mountain big sagebrush. A stand of antelope bitterbrush, a more preferred species, occurs near the original study, but for some reason, no attempt was made incorporate it into the sample. These bitterbrush plants display heavy use but appear vigorous. On the study site, mountain big sagebrush provides 90% of the total browse cover with a population of approximately 1,800 plants/acre. Mature plants are vigorous and relatively large, with an average height of over 2 feet and a crown of nearly 4 feet. Utilization was heavy in 1984, but has been light to moderate since then. Percent decadency was low from 1984-1996, averaging 15%. Although it did increase somewhat in 2001 to 26%. The number of dead plants in the population more than doubled between 1996 and 2001. Currently (‘01) the dead to live ratio is 1 to 4. However, recruitment of young sagebrush has been relatively high in 1996 and 2001 at 17% and 15% respectively. It appears adequate to maintain the population at the present time. Annual leader growth averaged just over 3 inches in 2001.

Other shrubs include occasional individuals of antelope bitterbrush, Rocky Mountain maple and bigtooth maple. Of particular interest is a small population of Stansbury cliffrose and cliffrose/bitterbrush hybrids growing slightly north of the study site. Broom snakeweed was encountered during the 1996 reading with the much larger sample size beginning to be used at that time. Snakeweed density is estimated at 740 plants/acre in 2001.

A vigorous herbaceous understory is associated with the mountain big sagebrush. Perennial grasses comprise a substantial portion of the herbaceous composition. However, annual brome grasses were abundant and accounted for 64% of the grass cover in 1996. Total grass cover contributed by annual grasses decreased to 43% in 2001. This is most likely due to several consecutive years of drought. Bulbous bluegrass is also abundant and has significantly increased in sum of nested frequency with each reading. Bluebunch wheatgrass remains at stable quadrat and nested frequency values in 2001. Other perennial grasses include small numbers of Kentucky bluegrass and Sandberg bluegrass.

A wide variety of forbs of varying growth forms were also found on the site. All forbs combined produced less than 5% total average cover in 1996, increasing to over 14% in 2001. This increase in forb cover is due to the increases in both perennial and annual species. The most common perennial forbs include western yarrow, arrowleaf balsamroot and yellow salsify. The most abundant annual species are willowweed and storksbill. Dyers woad, a noxious weed, is present on the site in low numbers.

1984 APPARENT TREND ASSESSMENT

Although much of the west facing slope surrounding the study area appears to be progressing toward grass-forb dominance, the study site appears to be a relatively stable big sagebrush community. Use is mostly heavy (81%), but vigor is good and percent decadency is within the acceptable range for sagebrush at 15%. Soil trend also appears relatively stable with only minor erosion occurring.

1990 TREND ASSESSMENT

Density of mature big sagebrush increased by 19% on the density plots (from 1,732 to 2,132 plants/acre). Plants show light to moderate hedging and have good vigor. There is a robust population of young sagebrush and few decadent plants. Trend is up for browse. Trend for herbaceous species is stable. Sum of nested frequency for perennial grasses increased while that of forbs decreased. Trend for soil is stable with no significant changes in the elements of ground cover.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - stable, but noticeable increase in bulbous bluegrass (3)

1996 TREND ASSESSMENT

Trend for soil is up with a significant decline in percent bare ground (16% to 5%). Litter cover remained similar and pavement and rock cover declined from 16% to 9%. Trend for browse is stable. The sagebrush density has remained similar between readings, utilization is light to moderate, vigor good, and percent decadence low at 14%. Reproduction remains high at 17%, which is adequate to maintain the population. The herbaceous understory is dominated by annual brome grasses. Trend is down due to a decline in the sum of nested frequency for perennial grasses and forbs. A low value species, bulbous bluegrass, is the only perennial species that increased in sum of nested frequency. Forbs are diverse but not abundant. Dyers woad is still not abundant, although it has doubled in its sum of nested frequency value since 1990.

TREND ASSESSMENT
soil - up (5)
browse - stable (3)
herbaceous understory - down and dominated by annual grasses (1)

2001 TREND ASSESSMENT

Trend for soil is stable. Vegetation and litter cover remain high and percent bare ground remains low. Trend for browse is stable. Mountain big sagebrush shows mostly light to moderate use, good vigor and adequate recruitment from young plants. Percent decadency did increase from 14% to 26%, but the current level is not excessive especially with several consecutive years of drought. Trend for the herbaceous understory is up as sum of nested frequency for perennial grasses and forbs nearly doubled.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - up (5)

HERBACEOUS TRENDS --
Herd unit 03 , Study no: 2

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
G	Agropyron spicatum	a140	b204	ab163	ab167	71	79	61	61	5.26	6.80
G	Bromus japonicus (a)	-	-	b349	a201	-	-	96	72	16.42	3.60
G	Bromus tectorum (a)	-	-	a36	b179	-	-	14	57	.86	7.52
G	Koeleria cristata	-	-	2	6	-	-	1	4	.00	.12
G	Melica bulbosa	7	3	-	-	3	1	-	-	-	-
G	Poa bulbosa	a5	b41	c79	d192	2	17	30	67	4.22	7.69
G	Poa fendleriana	4	-	-	-	1	-	-	-	-	-
G	Poa secunda	ab20	c113	a12	b41	12	42	6	18	.05	.35
Total for Annual Grasses		0	0	385	380	0	0	110	129	17.28	11.13
Total for Perennial Grasses		176	361	256	406	89	139	98	150	9.54	14.97
Total for Grasses		176	361	641	786	89	139	208	279	26.82	26.10
F	Achillea millefolium	b119	a47	a57	a82	47	21	22	33	1.41	1.87
F	Agoseris glauca	-	3	1	-	-	1	1	-	.00	-
F	Allium acuminatum	2	-	-	-	1	-	-	-	-	-
F	Alyssum alyssoides (a)	-	-	a94	b205	-	-	35	75	.20	1.60
F	Artemisia ludoviciana	1	5	3	4	1	4	1	2	.15	.41
F	Aster chilensis	-	-	-	7	-	-	-	2	-	.30
F	Astragalus spp.	b32	b30	a-	a8	16	13	-	4	-	.07
F	Balsamorhiza sagittata	17	20	13	14	9	11	6	8	.66	1.94
F	Camelina microcarpa (a)	-	-	-	-	-	-	-	-	-	.03
F	Calochortus nuttallii	ab5	a-	ab3	b10	2	-	1	5	.00	.05
F	Cirsium undulatum	-	-	2	-	-	-	1	-	.00	-
F	Collomia linearis (a)	-	-	a5	b22	-	-	2	10	.01	.07
F	Comandra pallida	-	-	-	9	-	-	-	4	-	.04
F	Collinsia parviflora (a)	-	-	-	1	-	-	-	1	-	.00
F	Epilobium brachycarpum (a)	-	-	b155	a64	-	-	66	27	1.39	.21
F	Erodium cicutarium (a)	-	-	a3	b76	-	-	1	23	.03	2.55
F	Eriogonum umbellatum	-	-	-	1	-	-	-	1	-	.00
F	Galium aparine (a)	-	-	-	3	-	-	-	1	-	.03
F	Hackelia patens	a3	b35	a3	a11	1	16	2	6	.06	.16
F	Hedysarum boreale	-	-	-	2	-	-	-	1	-	.03
F	Holosteum umbellatum (a)	-	-	a-	b15	-	-	-	7	-	.20
F	Isatis tinctoria	3	9	18	9	2	5	9	6	.24	.08
F	Lappula occidentalis (a)	-	-	5	5	-	-	2	3	.01	.39

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
F	Lactuca serriola	$_{a}$-	$_{a}$3	$_{a}$-	$_{b}$30	-	1	-	17	-	.24
F	Lithospermum ruderale	$_{ab}$2	$_{a}$-	$_{ab}$2	$_{b}$11	2	-	2	5	.18	.38
F	Lomatium spp.	-	-	-	2	-	-	-	1	-	.00
F	Lupinus argenteus	$_{a}$-	$_{a}$-	$_{ab}$4	$_{b}$9	-	-	2	5	.21	.39
F	Madia glomerata (a)	-	-	2	-	-	-	1	-	.00	-
F	Microsteris gracilis (a)	$_{b}$54	$_{a}$-	$_{a}$3	$_{a}$6	26	-	1	2	.00	.01
F	Polygonum douglasii (a)	-	-	7	8	-	-	5	3	.03	.04
F	Ranunculus testiculatus (a)	-	-	2	5	-	-	1	3	.00	.01
F	Rumex spp.	-	-	-	3	-	-	-	1	-	.03
F	Senecio multilobatus	-	-	-	1	-	-	-	1	-	.03
F	Tragopogon dubius	$_{c}$122	$_{b}$74	$_{a}$12	$_{c}$109	56	34	4	51	.04	2.66
F	Unknown forb-perennial	-	5	-	-	-	3	-	-	-	-
F	Veronica biloba (a)	-	-	$_{a}$9	$_{b}$27	-	-	3	10	.01	.12
F	Wyethia amplexicaulis	$_{b}$14	$_{a}$-	$_{a}$3	$_{a}$-	8	-	1	-	.03	-
F	Zigadenus paniculatus	-	-	7	-	-	-	2	-	.04	.01
Total for Annual Forbs		54	0	285	437	26	0	117	165	1.70	5.30
Total for Perennial Forbs		320	231	128	322	145	109	54	153	3.05	8.74
Total for Forbs		374	231	413	759	171	109	171	318	4.76	14.04

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 03 , Study no: 2

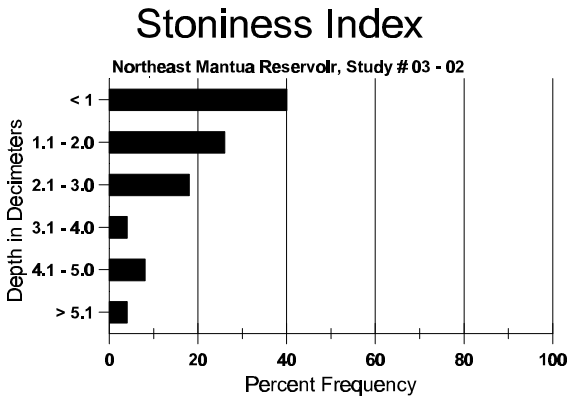
Type	Species	Strip Frequency		Average Cover %	
		'96	'01	'96	'01
B	Artemisia tridentata vaseyana	60	55	16.34	15.71
B	Gutierrezia sarothrae	11	13	.36	.78
B	Prunus virginiana	2	2	.00	.15
B	Purshia tridentata	1	1	.66	.85
Total for Browse		74	71	17.37	17.49

BASIC COVER --
Herd unit 03 , Study no: 2

Cover Type	Nested Frequency		Average Cover %			
	'96	'01	'84	'90	'96	'01
Vegetation	385	381	3.25	10.25	50.70	55.77
Rock	203	148	6.75	4.75	5.68	4.36
Pavement	207	200	6.50	11.75	3.84	3.82
Litter	399	378	66.00	57.25	58.45	45.47
Cryptogams	-	-	0	0	0	0
Bare Ground	167	170	17.50	16.00	5.36	9.88

SOIL ANALYSIS DATA --
Herd Unit 03, Study no: 02, NE Mantua Reservoir

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
15.1	66.0 (14.0)	7.4	22.0	36.4	41.6	3.6	29.4	179.2	.5



PELLET GROUP FREQUENCY --
Herd unit 03 , Study no: 2

Type	Quadrat Frequency	
	'96	'01
Rabbit	-	2
Elk	-	1
Deer	5	10
Cattle	2	-

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
01	01
26	N/A
-	-
270	21 (51)
-	-

BROWSE CHARACTERISTICS --
Herd unit 03 , Study no: 2

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	37	37	0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	30	35	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	00%	00%	00%	
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	0	Dec:		-
'90	0			-
'96	0			-
'01	0			-

Artemisia tridentata vaseyana																		
S	84	47	-	-	-	-	-	-	-	-	47	-	-	-	3133			47
	90	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	84	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	90	14	-	-	-	-	-	-	-	-	14	-	-	-	933			14
	96	16	-	-	-	-	-	-	-	-	15	-	1	-	320			16
	01	13	-	-	1	-	-	-	-	-	14	-	-	-	280			14
M	84	-	3	18	-	-	-	-	-	-	21	-	-	-	1400	33	36	21
	90	12	1	-	-	-	-	-	-	-	11	1	1	-	866	35	36	13
	96	40	24	-	-	-	-	-	-	-	64	-	-	-	1280	27	49	64
	01	23	26	5	-	-	-	-	-	-	52	2	-	-	1080	27	44	54
D	84	-	1	3	-	-	-	-	-	-	3	-	1	-	266			4
	90	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	96	7	6	-	-	-	-	-	-	-	10	-	1	2	260			13
	01	9	13	2	-	-	-	-	-	-	21	-	-	3	480			24
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	200			10
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	420			21

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	19%	81%	04%	+19%
'90	03%	00%	03%	-13%
'96	32%	00%	04%	- 1%
'01	42%	08%	03%	

Total Plants/Acre (excluding Dead & Seedlings)			
'84	1732	Dec:	15%
'90	2132		16%
'96	1860		14%
'01	1840		26%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	16	-	-	-	-	-	-	-	-	16	-	-	-	320			16
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	20	-	-	1	-	-	-	-	-	21	-	-	-	420	11	15	21
	01	34	-	-	-	-	-	-	-	-	34	-	-	-	680	11	17	34
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	3	-	-	-	-	-	-	-	-	1	-	-	2	60			3
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	00%	00%	00%	+ 0%
'01	00%	00%	05%	

Total Plants/Acre (excluding Dead & Seedlings)					
	'84	0	Dec:		0%
	'90	0			0%
	'96	740			0%
	'01	740			8%

Prunus virginiana																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	2	-	-	-	-	-	3	-	-	-	60			3
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20	13	0
	01	2	-	-	4	-	-	-	-	-	6	-	-	-	120	-	-	6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	00%	00%	00%	+50%
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)					
	'84	0	Dec:		-
	'90	0			-
	'96	60			-
	'01	120			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	1	-	-	-	-	-	-	1	-	-	-	20	75	98	1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	00%	100%	00%	+ 0%
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	0	Dec:		0%
'90	0			0%
'96	20			0%
'01	20			100%